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SOCIAL EFFECTS OF TRANSPORTATION

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The progress of mankind in devising means of transportation embraces three distinctive stages. The primitive man traveled on foot and moved his scanty belongings with his own muscle; and we can only imagine the ages that elapsed before he secured any aid for the transfer of his person or his property other than his own bodily powers.

Probably the first contrivance for carriage was a rough-hewn plank or pole dragged upon the ground. Two connected planks doubtless formed the original sled. Finally the idea was conceived—some accident suggesting it—of lessening friction by the use of rollers. The rollers gradually developed into wheels, and when at last the wheels were made in pairs which revolved upon an axle the essential feature of all subsequent vehicles was devised and employed.

The earliest movement on water, we may suppose, was equally crude and simple. Some observant savage noticed that wood did not sink, and later found out by experiment that a floating log would remain on the surface even when his own weight was added. The rude dug-out followed the discovery. The stick or limb by which the dug-out was pushed and turned shaped itself at length into the lighter and more effective paddle; the hollowed log was succeeded by a framed and covered structure, the paddles became oars; and thus was evolved in prehistoric times the type of all later boats on lake and stream. It was centuries after this—no one knows how many—before the force of wind was utilized by the invention of sails, and when that immense advance was achieved the enduring era of ship-building commenced.

Roughly speaking, then, we may assign to the first stage in the development of transport such results as were obtained by the muscular strength of man, whether applied directly to the articles carried or used in propelling the clumsy vehicles and water craft which he had constructed. The motive power in all cases

was the unaided energy of his own body. And no later addition to the resources then at his command, it should be observed, has wholly displaced the original method. The natural powers of locomotion have not only remained unabated, but have greatly increased by experience and training. Indeed, the manual handling of articles of property must always be an important incident of ownership and exchange, since no mechanical device can meet all the needs of transfer or equal the delicacy and dexterity of our bodily organs. Nor should we overlook in this connection the many-sided ingenuity which has been displayed in constructing and perfecting a great variety of vehicles for hand propulsion. The latest examples of this ingenuity are the light racing shells which can be rowed with such remarkable rapidity, and that unique and fascinating machine, the up-to-date bicycle. These are at once the survival and the consummation of primitive transportation, that is to say, transportation where human energy is the motive power.

To the second stage of this development belongs the great increase of force which was obtained by the subjugation of animals and their employment for land transportation, and by the use of sails and rudders which multiplied many times the efficiency of water carriage. When these two results were secured, man had added to his own bodily powers the superior strength of beasts of burden and the enormous energy derived from the winds of heaven. This was an immeasurable gain and marked the beginning of that wonderful civilization which slowly followed. The animal kingdom was brought into service for the varied functions of land distribution, and the ship which could be sailed and guided made every waterway subservient to man's requirements.

This hasty and imperfect outline brings us to a fact of history which seems to me not merely significant but profoundly impressive. With the subjection of animals and the use of wind-propelled vessels, both of which achievements reached a high degree of perfection in the unknown past, the means of transportation, broadly speaking, remained unchanged and unaugmented until a period not much prior to the present time. It is a long stretch of years from the savage cave-dweller to the twentieth-century man, and this wonderful world of ours had quite a career before the present generation was born. Long before other agencies of conveyance were dreamed of, while ox and horse, oar and sail, were the only

means of transport, the race had occupied most of the habitable globe and advanced to lofty heights of national greatness. Strong governments were established, vast populations engaged in varied pursuits, and opulent cities crowded with every luxury. The institutions of society had acquired strength and permanence, the arts of leisure and refinement had approached the limits of perfection, and inductive science had laid firm grasp on the secrets of nature. Great inventions and discoveries had widened the fields of activity, furnished the means and incentive for multiplied vocations and opened up in every direction alluring vistas of advancement. In a word, there was the developed and splendid civilization of little more than threescore years ago, before any new or different motive power was utilized for commercial intercourse.

And the weighty fact is that this immense and complex organism, with all its accumulations of wealth and wisdom, its diversified employments, its agriculture, manufactures, business affairs, financial systems, commercial and political relations, civil and social order—its very life and potency—was not only fitted to but dependent upon means of transportation which, as respects their expense, speed and capacity, had not essentially altered since the earliest tribes began to barter! Enormous growth of enterprise and enlightenment, amazing progress in every other sphere of human effort, with *motive power*, which lies at the foundation of every activity, remaining from first to last a constant quantity! Before the earliest recorded transaction—when Abraham purchased the field of Ephron and paid for it his “400 shekels of silver current with the merchant”—the horse and the ox were the established agencies of land distribution; and what better agencies, bear in mind, became available at any time thereafter until well along in the nineteenth century? Yet the ox was as strong and the horse as fleet, and their powers were as effectively employed, in the days of the Pharaohs as they are at the present time. Indeed, no history is so ancient as not to disclose the general use of animals for the purposes of carriage, while the vehicles to which they were harnessed had then been developed, in point of convenience and usefulness, to a degree not much exceeded in any subsequent period. Though differing considerably in appearance from the wagons with which we are familiar, yet they were constructed upon the same principles and performed the same functions as those now employed.

Similar progress was made in ship-building and seamanship as far back as history affords proof or tradition. There were oar and sail, tides and currents, and the inconstant winds, long before the ships of the Phœnicians brought back from the East the gold of Ophir; and what more was there than oar and sail, winds and currents—for all the purposes of navigation—until, almost within the memory of men yet living, the little steamboat of Robert Fulton ascended the Hudson River! In this long span of time, it is true, bridges were built, highways improved, vehicles finer fashioned, sailing craft increased in size, and the mariner's compass led to longer voyages; but, nevertheless, the forces by which movement is effected, the actual means of distribution on land and sea, continued without substantial change in character or efficiency age after age and century after century until the recent, the very recent, era of steam locomotion.

To my mind it is a matter of fascinating import that the long procession of the world's advancement down to the century just ended was conditioned by and dependent upon agencies of transportation which were themselves essentially unprogressive and incapable of important betterment. True, there were minor modifications from time to time in the line of mechanical adjustment, but the general methods employed, and the results obtained, showed no marked improvement or material alteration from those applied in the earliest days of commerce. Reduced to the forms in ordinary use there were at the last as at the first the beast of burden on land and the oar and sail on water. Yet thus hampered and restricted in the means of transportation, which is the basis of all commercial activity, there was built up in the long process of years the varied and advanced civilization which the last century inherited.

Then all at once, as it were, into and through this social and industrial structure, so highly organized, so complex in character, so vast in its ramifications, yet so adjusted and adapted to the fixed limitations of animal power, was thrust the new mode of conveyance by mechanical force, and the third stage of transportation was suddenly ushered in by the employment of steam as its principal motive power. The advent of this new and marvelous agency was the greatest and most transforming event in the history of mankind. It wrought an immediate and radical change in the elemental need of society, the means of distribution. The primary

function was altered both in essence and relations. The conditions of commercial intercourse were abruptly and completely altered, and a veritable new world of energy and opportunity invited the conquest of the race.

As time goes, this revolution has been phenomenally rapid. But yesterday, as it seems, and the first iron track had not been laid, and even the idea of steam as an available motive power had hardly been conceived; yet already, within the limits of an ordinary lifetime, long lines of railway—which sprung into being as if born of enchantment—have stretched out in every direction from one end of the land to the other. They have bridged the rivers, penetrated the wilderness, climbed over mountains and traversed the deserts with their highways of steel. There is scarce a hamlet so remote as not to hear the shrill whistle of the locomotive, and the clang of its warning bell is everywhere a familiar sound. In the passing of a generation the railroad and the steamship have transformed the whole realm of commerce, of industry and of social life. They have enriched every occupation, given multiplied value to every pursuit, added incalculably to the means of human enjoyment, and made our vast wealth possible; they are at once the greatest achievement and the greatest necessity of modern civilization.

It is little more than sixty years since the first steam road was constructed, yet at this time, within the limits of the United States alone, nearly 200,000 miles of railway are in active operation; and of this immense mileage—enough to put eight girdles around the globe—fifty per cent has been built in the last two decades and more than eighty per cent since the close of our civil war, only thirty-seven years ago. Elsewhere similar activity has prevailed during the same period, until animal power the world over has been almost wholly displaced for the purposes of transportation. Not only has the railroad become the chief agency by which inland commerce is carried on, but its influence upon all pursuits is so powerful, and its relation to every phase of activity so intimate and vital, that its effects upon social welfare and industrial progress present an inquiry of the gravest moment.

No other triumph over the forces of nature compares with this in its influence upon human environment. It has directly and powerfully affected the direction and volume of commercial currents, the location and movements of population, the occupations and pursuits in which the masses of men are engaged, the

division of labor, the conditions under which wealth is accumulated, the social and industrial habits of the world, all the surroundings and characteristics of the associated life of to-day. The world has seen no change so sudden and so amazing.

The next fact to be noted is hardly less remarkable. Not only are the new methods of transportation incomparably superior in speed, cheapness and capacity, but, unlike those which have been superseded, these new methods are themselves capable of indefinite increase and expansion. The maximum efficiency of an animal is so well known as to amount to a constant quantity, and this unit of power is practically unchangeable. Substantially the same thing is true of a vessel of given dimensions and given spread of canvas. For this reason distribution remained, as I have said, the one fixed and inflexible element to which other activities, however elastic and progressive, were necessarily adjusted and by which they were limited.

Now, a special and most suggestive feature of transportation by steam, electricity or other kinds of mechanical force is that its capacity is not only unmeasured and unknown, but will doubtless prove to be virtually inexhaustible. That is to say, no certain limits can be assigned to the operation or effect of these new agencies as compared with those which have been supplanted. Therefore, speed may reach many times the rate now attained, the size of vehicles may be greatly increased and the cost of carriage for the longest distances reduced to an astonishing minimum; so that, as progress goes on in developing the means and methods of distribution, the habits and needs of men will be more and more modified, with consequences to social order and the general conditions of life which may be far greater than have yet been imagined.

Among the results already realized, which directly forecast what will further happen, some of the more obvious may be briefly mentioned. For well understood reasons the speed and capacity of water craft are much superior to those of vehicles drawn by animals, while the cheapness of the former gives them a great advantage over the latter. While the old conditions prevailed, the waterways were mainly relied upon for the conveyance of bulky products. Commercial movements on land were, of course, considerable, but the transfer of heavy goods, such as enter most largely into ordinary consumption, was principally effected by sailing vessels. Therefore, the fertile lands along the river-banks

and the indented shores of the sea were the first to be occupied for agricultural pursuits, the exchange of produce for merchandise being accomplished by water carriage. The great cities founded prior to our time were for the most part located upon or near navigable streams while the masses of population outside the towns dwelt within easy reach of these natural channels.

But the building of railroads has often deflected and sometimes wholly altered the routes of distribution. In our own country, for example, notwithstanding it is penetrated by numerous rivers which flow, generally speaking, from north to south, the great volume of traffic is carried by railways running east and west across valleys and mountains. Even where the rail lines are parallel with river courses they absorb the greater share of freight and passenger movement. In short, the routes of land transportation in all the principal countries of the world have been largely recast in the last fifty years by the changes from river to rail conveyance.

The next most noticeable effect, as it seems to me, is the prodigious increase of commerce under the stimulus of modern agencies. It is estimated by Mulhall that as late as 1820 the carrying capacity of all the sailing vessels of the world—and there were then no others—did not much exceed 3,000,000 tons; yet this is less than one-sixteenth of the tonnage actually moved last year by the railroads of our New England states. This astonishing growth in the quantity of transported articles, and in so short a time, is sufficient to produce, as it certainly has produced, the most important and significant results; since the fact itself indicates a current volume of transport business compared with which the commerce of our grandfathers seems like the idle play of children. Because of this wonderful speed and cheapness of distribution, the average prices of food, fuel, clothing, building material and other necessary supplies have been greatly reduced, independent of the standard by which prices are measured. And this cheapening of most commodities has in turn brought a marked alteration, within a very brief period, in the style of living, dress, home-furnishings and the like, which makes the present conditions of life far more desirable and attractive than ever was known before.

The effect of this cheap conveyance is also seen in the commonness of pleasure travel, the extent of immigration, the spread

of population over new territories, and in all the employments and surroundings of the people everywhere. The railway is not only the chief means of developing uninhabited or thinly settled regions, but the same line may operate in both sparsely and thickly populated districts, since an indefinite number of trains can be moved on the same track. For instance, the 200,000 miles of railroads of the United States serve some 75,000,000 persons, distributed through an area, excluding Alaska, of more than 3,000,000 square miles; while in Great Britain about 22,000 miles of railway serve at least 45,000,000 persons, located within a mainland area of less than 117,000 square miles. Thus, in Great Britain as compared with the United States, one-ninth as much railway mileage reaches more than half as many persons, because of the density of a population confined within a territory not larger than one-twenty-fifth of the land surface of the United States.

Again, the railway at once causes the concentration of people in cities and at the same time is the prime factor in the creation of cities. It is impossible that such inland towns as Atlanta and Denver, for example, could have acquired their present importance without the facilities for carriage and intercourse which railroads provide. In 1870 nearly forty-seven per cent of all our people employed in gainful occupations were engaged in farming; while only twenty years later barely thirty-six per cent were following that pursuit. And what is still more suggestive, the recent census shows that more than one-third of our entire population live in towns of 5,000 inhabitants and upwards, as against less than seven per cent in 1830. That so great a change has taken place in so short a time in the geographic distribution of our people can only be explained by the potent force of steam transportation, while the fact itself has a social significance which can hardly be overstated.

In the region west of the Alleghanies the railroad has been the pioneer in opening up unoccupied lands for settlement, while the lines upon which railroads were there built and the points they reached determined the location and growth of numerous towns and cities in that great section of country. On the other hemisphere, as is well known, a wonderful railway is now pushing to completion across the vast stretches of Siberia, a territory larger than the United States and Europe combined, connecting the capital of Russia with the Pacific Ocean. The consummation of

that project cannot but have immense effect upon the commerce, industries, social welfare and military power of a large portion of the world's inhabitants.

In connection with this should be observed the rapid increase in stationary steam power which has been coincident with and primarily caused by steam locomotion. Taken together they make up the colossal forces now exerted in the fields of commerce and industry, in comparison with which all the power of all the beasts of burden is hardly worth the mention. And this in turn reminds us of the mutual action of production, shipping and land transportation in producing the stupendous results we everywhere observe. It is impossible that these gigantic agencies should come into such active operation without the most vital consequences to every phase of human life.

Take into account, also, the new and wonderful means of transmitting intelligence. The obstacles of time and distance, hitherto so formidable, are swept away by telegraph and telephone. We send our thought and speech with lightning swiftness to the four quarters of the globe, and hold all lands and peoples within the sphere of instant intercourse. So recent is this miracle that we are still dazzled by its marvels and fail to realize how powerfully it aids the unification of world-wide interests.

That this substitution of steam and electricity as the instruments of commerce has been an immeasurable gain is witnessed here and everywhere by half a century of unparalleled progress. Along these modern pathways the world has literally leaped. No longer tied to beasts of burden, the entire realm of industry has been quickened and enlarged; productive energy has been invigorated by new and limitless means of distribution; the products of the whole earth are embraced in wide circles of exchange; all the luxuries of all lands are brought to every household; wealth has multiplied until we are almost surfeited with its abundance; the genius of invention has been stimulated to larger exercise, the sphere of thought grandly extended, the impulses of charity awakened to nobler activity, while keener sympathy through closer contact is leading the race to real brotherhood.

But these manifold benefits have not been secured without many and serious dangers. The potent energy which produced such marvels of utility and convenience has generated an array of forces which test with severe strain the structure of organized

society. So radical a change in the methods of distribution, and consequently of production, was sure to be attended with peril as well as beneficence, and to entail a series of results, immense and far-reaching. Passing by the acute abuses which are incident to the process of development, for they are transitory and must gradually disappear, we may well consider the more profound and permanent effects, what I venture to call the economic effects, of present and future methods of transportation upon the whole range of industrial activity. This brings into view again the impressive fact I mentioned at the outset, and suggests some graver consequences than those that appear on the surface and appeal to ordinary observation.

When transportation was measured by the strength and endurance of animals, only a limited area could be reached from a given centre. Its slowness and expense confined all inland distribution within narrow bounds. Only eighty years ago it cost \$125 to move a ton of freight from Philadelphia to Pittsburg, and the average price for carrying the necessities of life was not less than twenty cents a ton for every mile of haul. On such a basis most commodities were shut off from distant markets, and farm products would seldom permit of conveyance more than 100 or 150 miles. Only such articles as were of small bulk and weight compared with their value were moved to any considerable distance from the place of production. For this reason the requirements of an ordinary family were almost wholly supplied from nearby sources. And this means—without amplifying the statement—that productive energy, for the most part, was restricted by the consuming capacity of the surrounding neighborhood. The forces outside each separate circle were but feebly felt and had little influence upon its daily affairs. Broadly speaking, the activities of each locality were adjusted to its own conditions and were practically undisturbed by like operations in other places. What we call competition was held in check by slow and costly means of conveyance; its effects were moderate and limited, its friction seldom severe.

But the use of steam for motive power and electricity for communication increased enormously the range of accessible markets, and at once intensified competition by the celerity and cheapness of distribution. Industrial strife has already become world-wide in extent, and distance an ineffectual barrier against its destructive

assaults. For the commercial factor of distance is not at all a matter of miles, it is merely a question of time and money. The fact that the cost of moving a hundred pounds of goods a single mile by wagon transports a ton of the same goods by rail more than three times further is some indication of the effect of cheap and rapid conveyance in bringing remote places closer together. Our grandparents got their supplies mainly in the localities where they resided and only a few persons were concerned in their production. To-day it may safely be said that five millions of people and five hundred millions of capital are directly or indirectly employed in furnishing an ordinary dinner. When merchandise of every description is carried at great speed from one end of the land to the other, and at an average cost of less than three-quarters of a cent a ton a mile, as is now the case, the expense of transport is but a trifling impediment to the widest distribution.

Nor should we forget that it was the opening up of new and ever enlarging markets, by the cheapness of steam transportation, which gave the first opportunity for the extensive use of machinery; and this in turn quadrupled the capacity of labor and greatly reduced the cost of large-scale production. By this revolution in the methods of manufacture—caused by the railroad and steamship—the mechanic was supplanted by the operative, and the skilled and independent craftsman of former days found his occupation gone. For what chance now have hand-made articles when the factory-made product is carried across the continent at nominal cost? But the factory without the railroad would be only a toy-shop. If its wares had to be hauled over country roads by mules and horses, the points they could reach would be few and nearby, and thus contracted sales would limit the size of the plant and the volume of its business. It is simply because transportation is now so speedy, so cheap and so abundant that great establishments have become profitable and driven their smaller rivals from the field.

These facts—which might be multiplied without limit—bear directly, as I think, and with a force not fully perceived, upon the whole problem of industrial competition. For, as the means by which industrial products are distributed become more convenient, quicker in action and less expensive, the area of distribution rapidly enlarges, and as the area of distribution enlarges the competition of industrial forces increases in something like geometrical

ratio. The movement of property by rail in the United States alone already exceeds three millions of tons every twenty-four hours. Think of the rivalry of products, the strife of labor, the strain and struggle of trade, which such a movement implies. With the constant acceleration of that movement, which is certain to happen, how long can the friction be endured? How soon will it become unbearable?

When Adam Smith wrote "The Wealth of Nations," it took two weeks to haul a wagon-load of goods from London to Edinburgh, and such a thing as a business or industrial corporation was virtually unknown. To-day the great enterprises of the world are in the hands of corporations, and the time is fast approaching when they will absorb all important undertakings. Why? Simply because the railroad and the steamship—cheap and rapid transportation, all the while growing cheaper and quicker—ever widening the area of profitable distribution, furnish the opportunity, otherwise lacking, for the employment of larger and still larger capital. This opportunity permits and encourages the concentration of financial resources; so that, within limits not yet ascertained, the larger the business the greater its possibilities of gain. But the legitimate, the inevitable offspring of corporations is monopoly. Why? Simply because the operation of these massive forces—impinging and grinding upon each other in every market—begets an extremity of mutual danger which always invites and often compels a common agreement as to prices and production; that is, a trust. Just as the implements of warfare may become so devastating in their effects that nations will be forced to live in amity, so the destructiveness and exhaustion of commercial strife in these larger spheres of action may make combination a necessity.

Thus the potent agencies by which distribution is more and more rapidly and cheaply effected, which so unite and intensify the forces of production, are fast altering the conditions and changing the character of industrial development. And the end is not yet; it outruns imagination. What will be the ultimate effect of these methods of conveyance when brought to higher perfection and employed with still greater efficiency? When these agencies of commerce are increased in number and capacity, as they will be; when cost is still further and greatly reduced, as it will be; when speed is doubled, as it will be, and quadrupled, as it may be; when the whole United States shall have reached the density of popu-

lation now existing in Great Britain, how can industrial competition possibly survive?

So, in the measureless and transforming effects of modern transportation, and the ends to which it resistlessly tends, I find the primary cause of the economic revolution upon which we have entered. The incoming of these new and unfettered forces not only changed the basic function of society, but disturbed its industrial order. In the effort to restore a working equilibrium the gravest difficulties are encountered, and we do not clearly see how they are to be overcome. Already we are compelled to doubt the infallibility of many inherited precepts and to reopen many controversies which our grandsires regarded as finally settled. The ponderous engine that moves twice-a-thousand tons across an empire of states, the ocean steamer that carries the population of a village on its decks and the products of a township in its hold, are indeed splendid evidences of constructive skill, but more than this they are economic problems as well which challenge and dismay the present generation. They force us to discredit the venerable maxim that "competition is the life of trade," and warn us, I think, that the political economy of the future must be built on a nobler hypothesis. If it be true in the long run, as I believe experience teaches, that where combination is possible competition is impossible, is it not equally true that combination becomes possible just in proportion as transportation becomes ampler, speedier and cheaper? So the opportunity, if not the necessity, for combination has already come in many lines of activity and will certainly come in many more. The circumstance that permits competition, its *sine qua non*, is mainly difference of conditions. Practically speaking, this difference is chiefly found in the means of distribution. As that difference disappears, with the constantly diminishing time and cost of transport, the ability to combine will enlarge and the inducement to do so become overwhelming. That seems to me the obvious tendency of our industrial and social forces to-day, and that tendency, I predict, will be more and more marked as time goes on.

In the unrest and discontent around us, deep-seated and alarming here and there, I read the desperate attempt to avoid the effects of industrial competition and a tremendous protest against its savage reprisals. Every trust and combination, whether organized by capitalists or by artisans, is a repudiation of its teachings and a denial of its pretensions. The competitive theory may

have answered the age of mules and sail-boats and spinning-wheels, but it fails to satisfy the interlacing needs or to sustain the interdependent activities which are founded on modern methods of intercourse and distribution; it is a theory unsuited to the era of railways and wireless telegraphy, this era of ours, so restless in thought, so resistless in action.

This, then, as I conceive, is the underlying question. Shall we continue to enforce with precept and penalty the rule of competition, whose cruel creed is "every man for himself," or shall the effort and industry of the world be hereafter conducted on a more humane and fraternal principle? That is to say, is society—stripped of its polish and altruistic pretences—is society after all only a mass of struggling brutes fighting for the best places and the biggest bones, and is government simply an armed referee standing by to see that every dog has fair play? In short, is personal selfishness the ultimate force and individual greed the bottom fact? For myself, I disbelieve the doctrine. I am not terrified by the cry of paternalism nor dismayed by unreasoning clamor at the dangers of monopoly. The trusts and the unions are here, in money, in labor, in production and in distribution—they came with the railroad and the steamship—and they have come to stay.

When population was scattered and sparse, when movement was difficult and costly, when communities were isolated by distance and by dissimilarity, and bonds of relationship were feeble and few, the attrition of rivalry was complacently endured. But now, when seas are spanned with steamships and netted with electric wires; when city and forest, farm and factory, mine and counting-room are joined together by innumerable pathways of steel, and the swift locomotive, rushing across continents—like the shuttle through the loom—weaves this majestic fabric of commerce which covers the globe; when life is no longer localized in effort or achievement, and the thought of one man is the instantaneous possession of all men, the friction of unbridled competition has become irksome and intolerable. It is folly to shut our eyes to unmistakable facts or to stand in the way of inevitable events. Doubters may deride, demagogues denounce, and ignorant law-makers strive to build up legal barriers; but neither agitation, nor protestation, nor legislation can stop the growth or prevent the advance of industrial federation.

I much mistake, therefore, if we are not entering upon a period

of great transitions, a period of difficulty and many dangers. The whole structure of industry and social life is liable to be subjected to a strain—possibly to a shock—for which experience furnishes no guiding precedent. We have settled the administrative questions; we can collect taxes, build court-houses and pay the policeman. We have settled the political questions; for the nation lives and will live, the greatest and grandest in all the earth. But the further test is now to come, the test of the ocean liner and the limited express. Can we settle the economic questions? Can we raise this wide realm of industry from selfishness to charity, from strife to friendship, from competition to co-operation, from the warring instincts of the savage state to the larger and nobler needs of associated life? This is the problem which steam and electricity present for solution.

Will there be a fourth stage and another revolution in the methods of transportation? That is to ask, I suppose, will the puzzle of aerial navigation find a practical solution? Whether it does, or whenever it does, of this we may be certain, that the varied products of labor and skill, the endless commodities that supply our ever-growing wants, will always seek their passage from producer to consumer along the routes of least resistance. Therefore, it may happen, in some bright and wonderful to-morrow, nearer to us perhaps than we imagine, that the stubborn land over which our ponderous vehicles are now dragged will be abandoned, even the liquid waterways discarded, and the vast commerce of the future be borne swiftly and noiselessly through the yielding air. If that marvelous day shall come, assuredly will it bring its harder questions and press us with its weightier demands.